

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 2
TO
CLEANUP AND ABATEMENT ORDER NO. 91-45
FOR
PETROLEUM HYDROCARBON CONTAMINATION OF GROUND WATER
IN THE DOWNTOWN SAN DIEGO AREA
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region, (hereinafter Regional Board) finds that:

1. On May 13, 1991 the Regional Board Executive Officer issued Cleanup and Abatement Order No. 91-45 to the Redevelopment Agency of the City of San Diego (RACSD); Shell Oil Company and G.T.F. Properties; UNOCAL Corporation and Golden West Hotel; Greyhound Lines, Inc. and Transportation Leasing Company (hereinafter dischargers) for discharges of petroleum hydrocarbons to the vadose zone and underlying ground water.
2. On July 26, 1991 the Regional Board Executive Officer issued Addendum No. 1 to Cleanup and Abatement Order No. 91-45.
3. By letter dated August 20, 1990, a Remedial Action Plan (RAP) was submitted by the Centre City Redevelopment Corporation, on behalf of all the responsible parties named in the cleanup and abatement order to address the floating free product on the ground water in the Marina redevelopment area. The RAP proposed that product skimming be utilized to reduce the total mass of hydrocarbons in the subsurface. A reduction in the mass of hydrocarbons through skimming was thought to reduce the likelihood that the floating hydrocarbons would migrate.
4. The plan was implemented by the responsible parties pursuant to Directive 1 of Cleanup and Abatement Order 91-45 and Addendum No. 1. Product extraction by manual skimming was initiated in June, 1991. A pilot fixed (automated) skimming program was also initiated at the end of September, 1991 at three locations. By letter dated May 26, 1992 the consultants for the dischargers, Geomatrix, reported that as of April 1992, only 365 gallons of free product had been removed from the ground water by skimming. This removal rate was considered too low for timely removal of hydrocarbons from the subsurface given the published estimates of hydrocarbons in the subsurface.
5. In early 1992 the dischargers elected to undertake a bioventing/ soil vapor extraction pilot study to evaluate the efficacy of this technology for removing hydrocarbons in the subsurface area. Geomatrix reports that this technology

involves removal of fuel hydrocarbons by drawing volatile hydrocarbons from the subsurface and consuming them in an internal combustion engine, thermal oxidizer, and catalytic converter. The system consists of vapor extraction of the gasoline fraction and continued skimming of the diesel fraction through the use of large diameter wells under vacuum. The system also enhances the ability of microorganisms to biodegrade gasoline and diesel fuel. Soil vapor extraction circulates air through the subsurface, replenishing the oxygen supply and sustaining the biodegradation rate. Reduction of the hydrocarbon mass by biodegradation will be greater in the soil zone than in the floating product zone because more surface area and oxygen are available to support biologic activity in the soil zone.

6. Two day vacuum extraction tests were conducted by Geomatrix at two locations; one where the product was primarily gasoline (the Shell site) and the other location where the product is primarily diesel fuel (the Greyhound site). The test results contained in a Geomatrix report dated June 5, 1992 demonstrated that bioventing/vacuum extraction would remove significantly more fuel hydrocarbons than could be accomplished through free product skimming. Approximately 135 to 145 gallons of fuel product (gasoline) were removed at the Shell site and approximately 65 to 75 gallons of fuel product (diesel) were removed from the Greyhound site during the two day pilot study.
7. By letter to the Regional Board dated December 23, 1992 Anthony D Daus, Vice President and Principal Hydrogeologist, Geomatrix Consultants, Inc., summarized the results of free ~~product skimming, ground water monitoring and Dr. David~~ Huntley's evaluation of the distribution and mobility of hydrocarbons in the subsurface at the Greyhound site. Most of the fuel hydrocarbons were found to be held in the soil column above the water table and are thus relatively immobile with respect to migration within the capillary fringe of the water table. Product skimming was found to not remove significant volumes of fuel hydrocarbons. Bioventing/vapor extraction was found to remove significantly more mass of fuel hydrocarbons through volatilization of a portion of the gasoline and bioremediation of the diesel and gasoline than product skimming.
8. The December 23, 1993 Geomatrix letter also requested that the Cleanup and Abatement Order be modified to:
 - a) not require continued skimming of the monitoring wells containing floating hydrocarbons;

- b) change the Remedial Action Program from an area wide free extraction program to a site specific cleanup objective and methodology; and
 - c) modify the frequency of area wide ground water level and product thickness monitoring program measurements described in Directive 1.a. from every month to every other month.
9. The Regional Board understands that all of the dischargers named in the cleanup and abatement order plan to implement the bioventing/vapor extraction program described in Finding 5 of this Addendum.
10. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et. seq.) in accordance with Section 15321, Chapter 3, Title 14, California Code of Regulations.

IT IS HEREBY ORDERED, that pursuant to Section 13304 of the California Water Code the dischargers shall comply with the following directives:

1. The dischargers shall submit a Remedial Action Plan by May 1, 1993 describing the proposed actions, for implementation of the bioventing/vapor extraction program described in the June 5, 1992 report by Geomatrix Consultants, and a proposed schedule for their completion. The dischargers shall modify the Remedial Action Plan as directed by the Regional Board Executive Officer. In the interest of minimizing environmental contamination and promoting prompt cleanup, the dischargers may begin implementation of the proposed actions after the Remedial Action Plan has been submitted and before it has received Regional Board Executive Officer concurrence. Implementation of the Remedial Action Plan shall begin sixty (60) calendar days after submittal, unless the dischargers are directed otherwise by the Regional Board Executive Officer. Before beginning the activities described in the Remedial Action Plan the dischargers shall;
- a) Notify the Regional Board Executive Officer in writing by registered mail of the intent to initiate the proposed actions included in the Remedial Action Plan submitted; and
 - b) Comply with any conditions set by the Regional Board Executive Officer including mitigation of adverse consequences from cleanup activities.

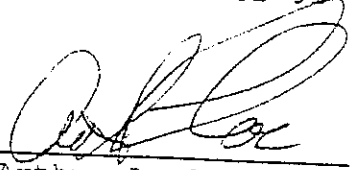
2. The dischargers shall:

- a) On a bimonthly basis measure the free product and water levels in all monitoring wells.
- b) Continue the sampling required under Directives 1.b and 1.c of Cleanup and Abatement Order 91-45 as modified by Addendum No. 1.
- c) Continue implementation of the remedial actions required in the August 20, 1990 Remedial Action Plan until the such time as the revised Remedial Action Plan described in Directive 1 of this Addendum is implemented.

PROVISIONS

1. Directive No. 1.a of Cleanup and Abatement Order 91-45 is rescinded.

Ordered by: _____


Arthur L. Coe
Executive Officer

Issuance Date: March 5, 1993
